![ADFweb logo]

Industrial Electronic Devices

# User Manual

Revision 1.001
English

## J1939 / KNX - Converter

(Order Code:  HD67810-KNX-B2)

for Website information:
www.adfweb.com?Product=HD67810

for Price information:
www.adfweb.com?Price=HD67810-KNX-B2

### Benefits and Main Features:

⊕  Very easy to configure

⊕  Electrical isolation

⊕  Temperature range: -40°C/85°C (-40°F/185°F)

User Manual

For others KNX products, see also the following links:

**Converter KNX to**

| | |
|---|---|
| www.adfweb.com?Product=HD67801 | **(BACnet Master)** |
| www.adfweb.com?Product=HD67802 | **(BACnet Slave)** |
| www.adfweb.com?Product=HD67803 | **(CAN)** |
| www.adfweb.com?Product=HD67804 | **(CANopen)** |
| www.adfweb.com?Product=HD67807 | **(EtherNet/IP)** |
| www.adfweb.com?Product=HD67808 | **(DeviceNet Master)** |
| www.adfweb.com?Product=HD67809 | **(DeviceNet Slave)** |
| www.adfweb.com?Product=HD67811 | **(M-Bus Master/wM-Bus)** |
| www.adfweb.com?Product=HD67812 | **(Modbus Master)** |
| www.adfweb.com?Product=HD67813 | **(Modbus Slave)** |
| www.adfweb.com?Product=HD67814 | **(Modbus TCP Master)** |
| www.adfweb.com?Product=HD67815 | **(Modbus TCP Slave)** |
| www.adfweb.com?Product=HD67818 | **(PROFINET)** |
| www.adfweb.com?Product=HD67820 | **(SNMP)** |
| www.adfweb.com?Product=HD67821 | **(DMX)** |
| www.adfweb.com?Product=HD67822 | **(DALI)** |
| www.adfweb.com?Product=HD67825 | **(Ethernet)** |

Do you have an your customer protocol?
www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?
www.adfweb.com?Cmd=helpme

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**INDEX:**

**UPDATED DOCUMENTATION:**

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- ⬦ Updated
- ⬦ Related to the product you own

To obtain the most recently updated document, note the "document code" that appears at the top right-hand corner of each page of this document.

With this "Document Code" go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper "Document Code" and download the updates.

**REVISION LIST:**

| Revision | Date | Author | Chapter | Description |
|---|---|---|---|---|
| 1.000 | 15/06/2015 | Ff | All | First Release |
| 1.001 | 05/06/2017 | Ff | All | Revision |
|  |  |  |  |  |
|  |  |  |  |  |

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**SECURITY ALERT:**

### GENERAL INFORMATION
To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device, legal and safety regulation are required for each individual application. The same applies also when using accessories.

### INTENDED USE
Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

### QUALIFIED PERSONNEL
The device can be used only by qualified personnel, strictly in accordance with the specifications.
Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

### RESIDUAL RISKS
The device is state-of-the-art and is safe. The instruments can represent a potential hazard if they are inappropriately installed and operated by untrained personnel. These instructions refer to residual risks with the following symbol:
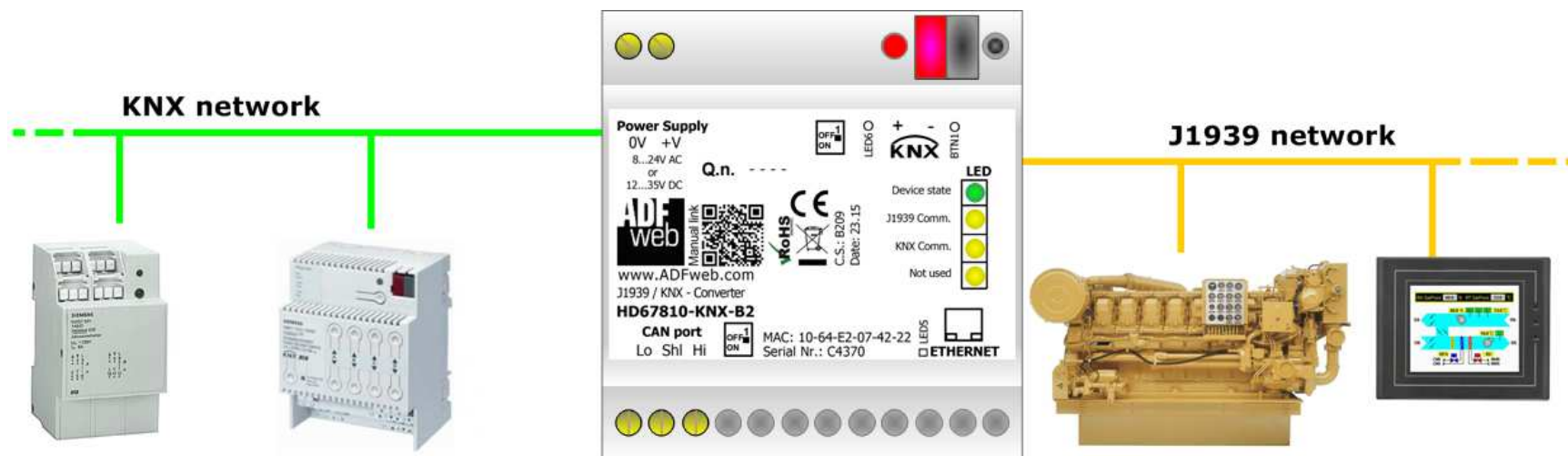
⚠ This symbol indicates that non-observance of the safety instructions is a danger for people that could lead to serious injury or death and / or the possibility of damage.

### CE CONFORMITY
The declaration is made by our company. You can send an email to support@adfweb.com  or give us a call if you need it.
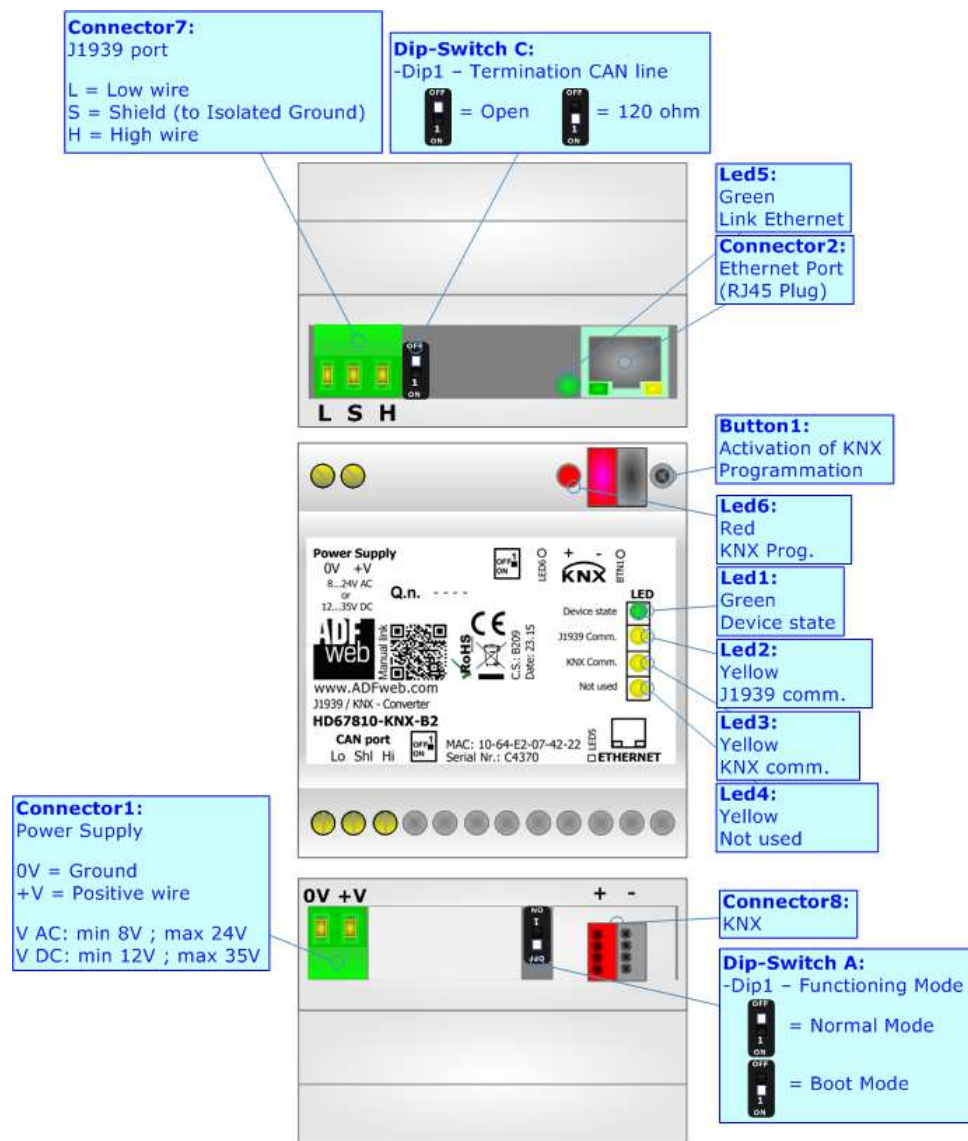
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**EXAMPLE OF CONNECTION:**

**CONNECTION SCHEME:**

**Connector7:**
J1939 port

L = Low wire
S = Shield (to Isolated Ground)
H = High wire

**Dip-Switch C:**
-Dip1 – Termination CAN line

= Open    = 120 ohm

**Led5:**
Green
Link Ethernet

**Connector2:**
Ethernet Port
(RJ45 Plug)

L S H

**Button1:**
Activation of KNX
Programmation

**Led6:**
Red
KNX Prog.

Power Supply
0V   +V
8...24V AC
or
12...35V DC
Q.n. - - - -

www.ADFweb.com
J1939 / KNX - Converter
**HD67810-KNX-B2**
CAN port
Lo  Shl  Hi    MAC: 10-64-E2-07-42-22
Serial Nr.: C4370    ETHERNET

Device state
J1939 Comm.
KNX Comm.
Not used

**Led1:**
Green
Device state

**Led2:**
Yellow
J1939 comm.

**Led3:**
Yellow
KNX comm.

**Led4:**
Yellow
Not used

**Connector1:**
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

0V +V    +   -

**Connector8:**
KNX

**Dip-Switch A:**
-Dip1 – Functioning Mode

= Normal Mode

= Boot Mode

*Figure 1: Connection scheme for HD67810-KNX-B2*

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**CHARACTERISTICS:**

The HD67810 is a J1939 / KNX Converter.

It has the following characteristics:

- Up to 1440 bytes in reading and 1440 bytes in writing;
- Triple isolation between KNX - Power Supply, KNX – CAN, Power Supply - CAN.
- Two-directional information between KNX bus and J1939 bus;
- Mountable on 35mm Rail DIN;
- Wide power supply input range: 8…24V AC or 12…35V DC;
- Wide temperature range:  -40°C / 85°C [-40°F / +185°F].

**CONFIGURATION:**

You need Compositor SW67810 software on your PC in order to perform the following:

- Define the parameter of J1939 line;
- Define the parameter of KNX line;
- Define the KNX messages that the Converter can accept;
- Define the KNX frames that the Converter sends trough the KNX line;
- Define the map of KNX byte that must be written in the J1939 side;
- Define the map of which J1939 data must be written in KNX messages;
- Update the device.

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**POWER SUPPLY:**

The devices can be powered at 8...24V AC and 12...35V DC. For more details see the two tables below.

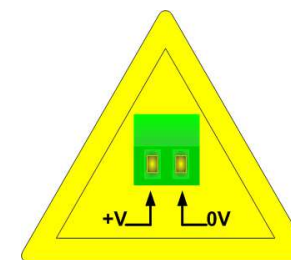| VAC 〜 | | VDC ▬▬ | |
|---|---|---|---|
| **Vmin** | **Vmax** | **Vmin** | **Vmax** |
| **8V** | **24V** | **12V** | **35V** |

Consumption at 24V DC:

| Device | Consumption [W/VA] |
|---|---|
| HD67810-KNX-B2 | 3.5 |

Connector1:
Power Supply

0V = Ground
+V = Positive wire

V AC: min 8V ; max 24V
V DC: min 12V ; max 35V

- +      V+ 0V
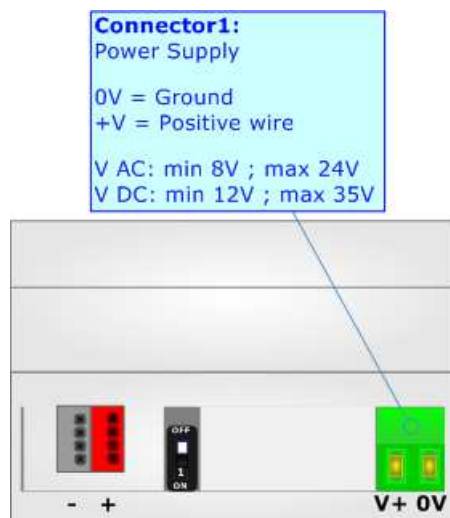
**Caution:  Not reverse the polarity power**

+V        0V

HD67810-KNX-B2

**FUNCTION MODES:**

The device has got two functions mode depending of the position of the 'Dip1 of Dip-Switch A':

- The first, with 'Dip1 of Dip-Switch A' at "OFF" position, is used for the normal working of the device.
- The second, with 'Dip1 of Dip-Switch A' at "ON" position, is used for upload the Project and/or Firmware.

For the operations to follow for the updating, see 'UPDATE DEVICE' section.

According to the functioning mode, the LEDs will have specifics functions, see 'LEDS' section.

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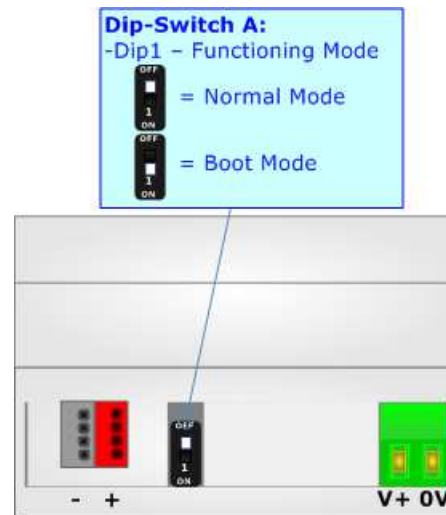
## LEDS:

The device has got six LEDs that are used to give information of the functioning status.
The various meanings of the LEDs are described in the table below.

| LED | Normal Mode | Boot Mode |
|---|---|---|
| 1: Device State (green) | Blinks slowly (~1Hz) | **Blinks quickly:** Boot state <br> **Blinks very slowly (~0.5Hz):** update in progress |
| 2: J1939 communication (yellow) | Blinks when J1939 frame is received | **Blinks quickly:** Boot state <br> **Blinks very slowly (~0.5Hz):** update in progress |
| 3: KNX communication (yellow) | Blinks when KNX frame is received | **Blinks quickly:** Boot state <br> **Blinks very slowly (~0.5Hz):** update in progress |
| 4: Not used (yellow) | **OFF** | **Blinks quickly:** Boot state <br> **Blinks very slowly (~0.5Hz):** update in progress |
| 5: Ethernet Link (green) | **ON:** Ethernet cable connected <br><br> **OFF:** Ethernet cable disconnected | **ON:** Ethernet cable connected <br><br> **OFF:** Ethernet cable disconnected |
| 6: KNX Programmation (red) | **ON:** KNX Programmation activated <br><br> **OFF:** KNX Programmation not activated | **OFF** |
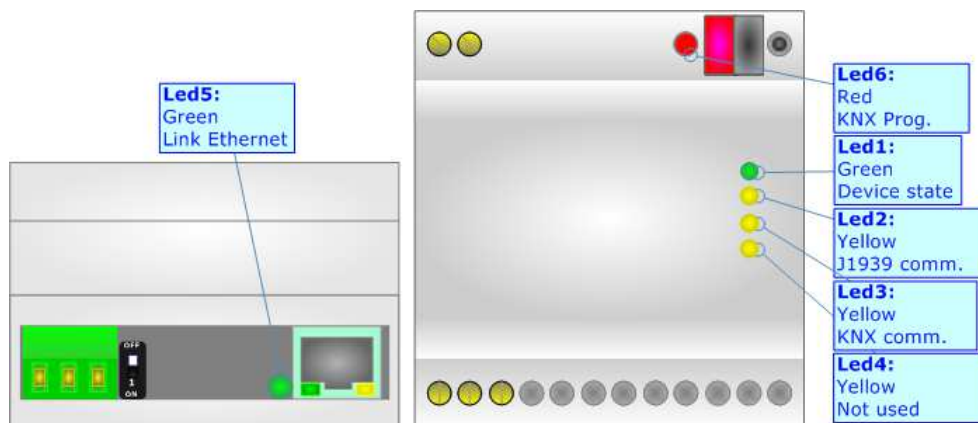
**J1939:**

For terminate the J1939 line with a 120Ω resistor it is necessary that the Dip1 of 'Dip-Switch C' is at ON position.
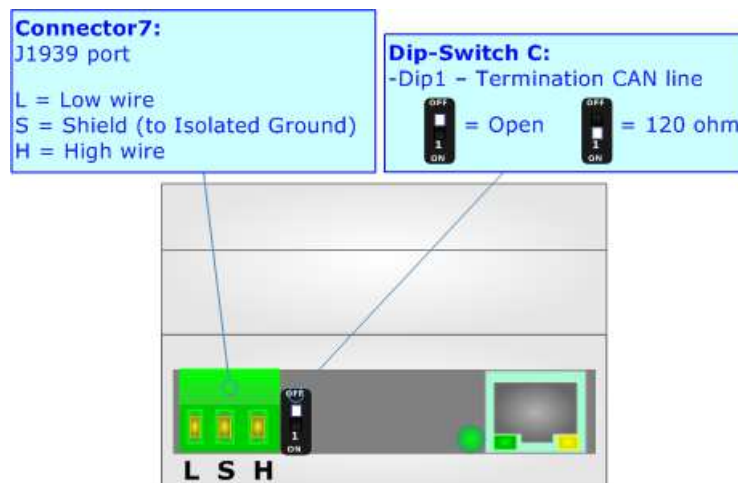


Cable characteristics:

| DC parameter: | | Impedance | 70   Ohm/m |
|---|---|---|---|

| AC parameters: | | Impedance | 120   Ohm/m |
|---|---|---|---|
| | | Delay | 5  ns/m |

| Length | | Baud Rate [bps] | Length MAX [m] |
|---|---|---|---|
| | | 10 K | 5000 |
| | | 20 K | 2500 |
| | | 50 K | 1000 |
| | | 100 K | 650 |
| | | 125 K | 500 |
| | | 250 K | 250 |
| | | 500 K | 100 |
| | | 800 K | 50 |
| | | 1000 K | 25 |

**KNX:**

KNX is the standard that allows the automated and decentralized management of the technologic plans of a big typology of structures: commercial buildings, factories, houses, public locals, schools and so on.
KNX can be used in all the applications and functions for the building automations: from lighting to control dampers, to the security, to the heating monitoring, to the conditioning, to the hydric control and alarms, to energy management and so on.
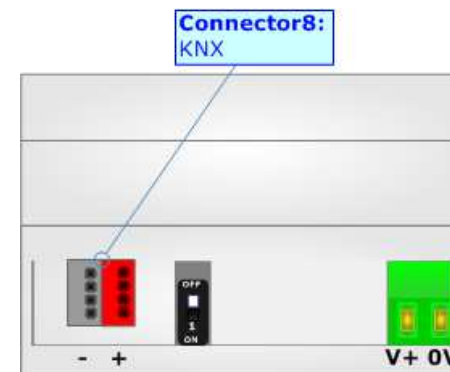


| Characteristics | Description TP1-256 |
|---|---|
| Medium | Shielded Twisted Pair |
| Topology | Linear, Star, Tree or mixed |
| Baudrate | 9600 bps |
| Device supplying | Normal: bus powered devices<br>Optional: remote powered devices |
| Device power consumption | 3 mA- 12 mA |
| Power Supply Unit (PSU) | DC 30 V |
| Number of PSU's per physical Segment | Max. 2 |
| Number of connectable devices per physical Segment | Max. 256 |
| Number of addressable devices per physical Segment | Max. 255 |
| Total cable length per physical Segment | Max. 1000 m |
| Distance between two devices | Max. 700 m |

*(\*) Taken from KNX specifications*

**ETHERNET (PROGRAMMING PORT):**

The Ethernet ports are used for programming the device.
The Ethernet connection must be made using Connector2 of HD67810-KNX-B2 with at least a Category 5E cable. The maximum length of the cable should not exceed 100m. The cable has to conform to the T568 norms relative to connections in cat.5 up to 100 Mbps. To connect the device to an Hub/Switch is recommended the use of a straight cable, to connect the device to a PC is recommended the use of a cross cable.

Led5:
Green
Link Ethernet

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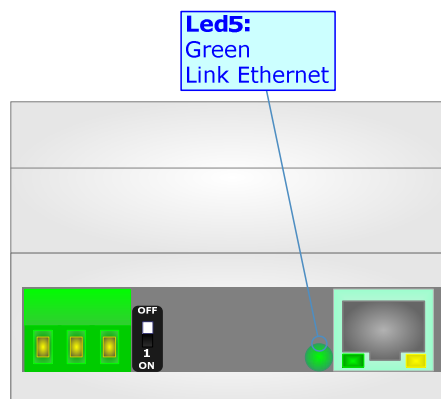
**USE OF COMPOSITOR SW67810:**

To configure the Converter, use the available software that runs with Windows called SW67810. It is downloadable on the site www.adfweb.com and its operation is described in this document. *(This manual is referenced to the last version of the software present on our web site)*. The software works with MSWindows (XP, Vista, Seven, 8, 10; 32/64bit).

When launching the SW67810, the window below appears (Fig. 2).

Note:
    It is necessary to have installed .Net Framework 4.
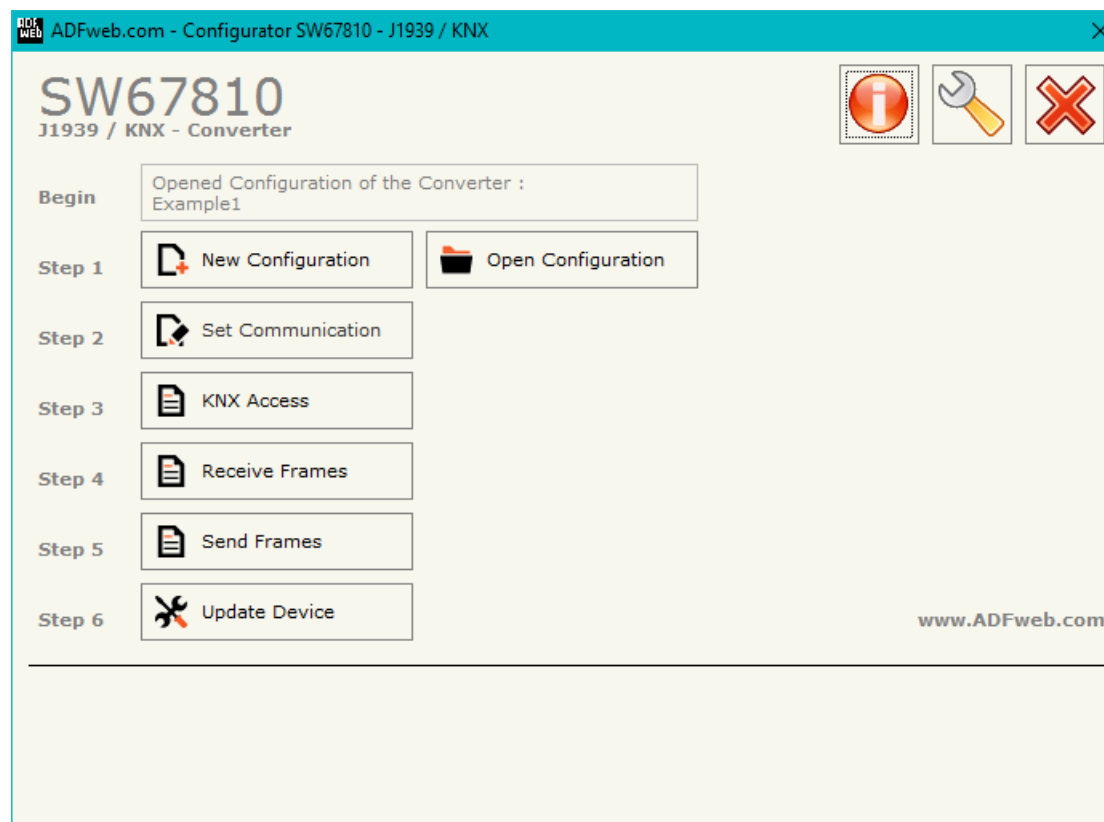


*Figure 2: Main window for SW67810*

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**NEW CONFIGURATION / OPEN CONFIGURATION:**

The  "**New Configuration**" button creates the folder which contains the entire device's configuration.
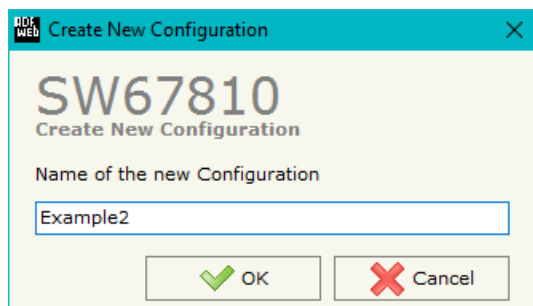
A device's configuration can also be imported or exported:

- To clone the configurations of a Programmable "J1939 / KNX - Converter" in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents;
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "**Open Configuration**".

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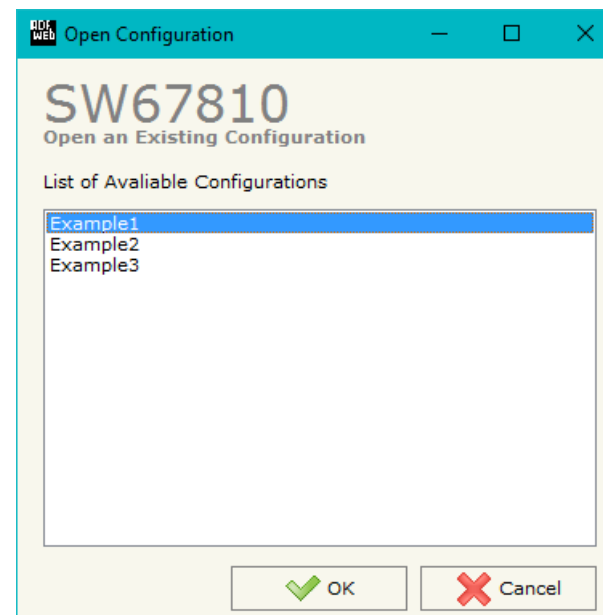
**SOFTWARE OPTIONS:**

By pressing the "**Settings**" (🔧) button  there is the possibility to change the language of the software and check the updatings for the compositor.

In the section "Language" it is possible to change the language of the software.
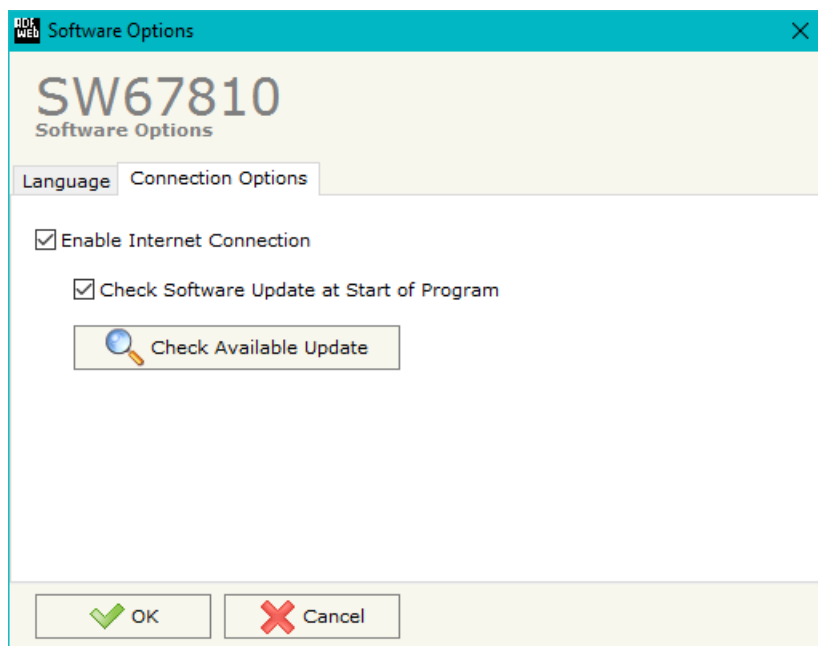
In the section "Connection Options", it is possible to check if there are some updatings of the software compositor in ADFweb.com website.
Checking the option "**Check Software Update at Start of Program**", the SW67810 check automatically if there are updatings when it is launched.

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**SET COMMUNICATION:**

This section define the fundamental communication parameters of two buses, KNX and J1939.

By Pressing the "**Set Communication**" button from the main window for SW67810 (Fig. 2) the window "Set Communication" appears (Fig. 3).
The window is divided in three sections, one for the KNX, one for the J1939 and the other for Ethernet.

The means of the fields for "KNX" are:

- In the field "**Type**" the type of KNX is defined (fixd to 'KNX TP');
- In the field "**ID Device**" the ID of the KNX side of the converter is defined.

The means of the fields for the "J1939" section are:

- In the field "**Baudrate**" the baudrate for the J1939 line is defined;
- In the field "**TimeOut Data (s)**" a time is defined. When this time is elapsed, the data on KNX side are set to 0xFF;
- If the field "**Enable Peer to Peer**" is checked, the converter accepts any ID that have the PGN inserted in the section "Receive Frames";
- In the field "**Device ID J1939**" the ID for J1939 side of the converter is defined.

The means of the fields for "Ethernet" are:

- In the fields "**IP ADDRESS**" the IP address of the converter is defined;
- In the fields "**SUBNET Mask**" the SubNet Mask of the converter is defined;
- In the fields "**GATEWAY**" the default gateway of the net is defined. This feature can be enabled or disabled pressing the Check Box field. This feature is used for going out of the net.
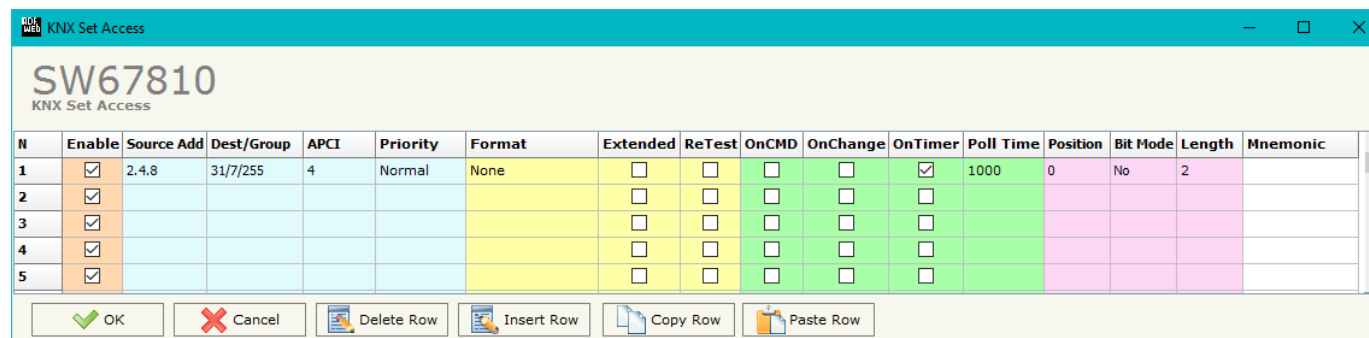
*Figure 3: "Set Communication" window*

**KNX ACCESS:**

By pressing the "**KNX Access**" button from the main window for SW67810 (Fig. 2) the "KNX Access" window appears (Fig. 4).

The means of the fields are:

+ If the field "**Enable**" is checked, the KNX message is enabled;

+ In the field "**Source Address**" the Source Address to assign to the KNX message is defined;



Figure 4: "KNX Set Access" window

+ In the field "**Dest/Group** the Group address (2 level structure, 3 level structure or free address structure) or the device address is defined. In case of Group address, the levels must be separated by '/', in case of Device address, the parts of the address must be separated by '.';

+ In the field "**APCI**" the APCI of the KNX message is defined. You can choose between the following:
  o Read: it is used to send a reading request to a KNX device;
  o Write: it is used to send a writing request to a KNX device;
  o Specific value (edited manually).

+ In the field "**Priority**" the Priority of the KNX message is defined. You can choose between the following:
  o System (Highest);
  o Urgent;
  o Normal;
  o Low (Lowest).

+ In the field "**Format**" the data format of the KNX message is defined;

+ If the field "**Extended**" is checked, the extended format of the KNX message is used;

+ If the field "**ReTest**" is checked, the KNX message is re-sent in case of not correct response;

+ If the field "**OnCMD**" is checked, the KNX request is sent when a J1939 frame is received;

+ If the field "**On Change**" is checked, the gateway sends the KNX command when the data on J1939 change the value;

+ If the field "**On Timer**" is checked, the gateway sends the KNX command cyclically;

- In the field "**Poll Time**" the delay in ms between two KNX commands is defined (if "On Timer" is checked);
- In the field "**Position**" insert the address of the internal array where placing the information;
- In the field "**Bit Mode**" insert the start bit of the first byte of the field "Position" where start to insert the data read;
- In the field "**Length**" the dimension of the KNX message is defined;
- In the field "**Mnemonic**" the description for the request is defined.

Note:
If the field "On change" is checked and the "Poll Time" is different from 0, the converter sends the KNX command cyclically and also when the data is changed.
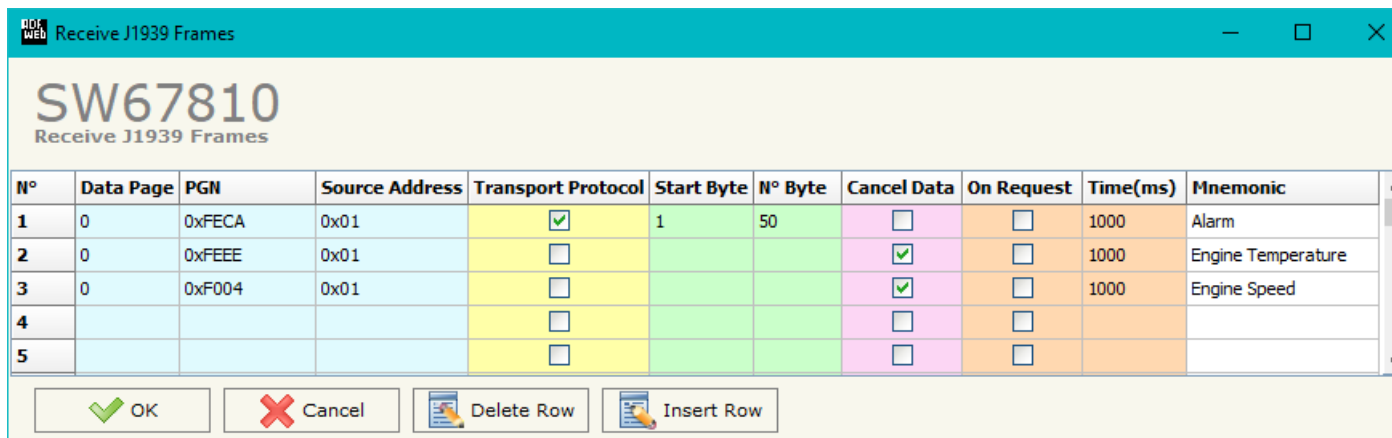
Note:
If the field "OnCMD", "OnChange" and "OnTimer" are not checked, the converter only sniffs the bus in order to monitor the status of the KNX message.

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**RECEIVE FRAMES:**

By pressing the "**Receive Frames**" button from the main window for SW67810 (Fig. 2) the "Receive J1939 Frames" window appears (Fig. 5).
The COB inserted in this table contains the Output data of KNX. These frames are accepted by the Converter.
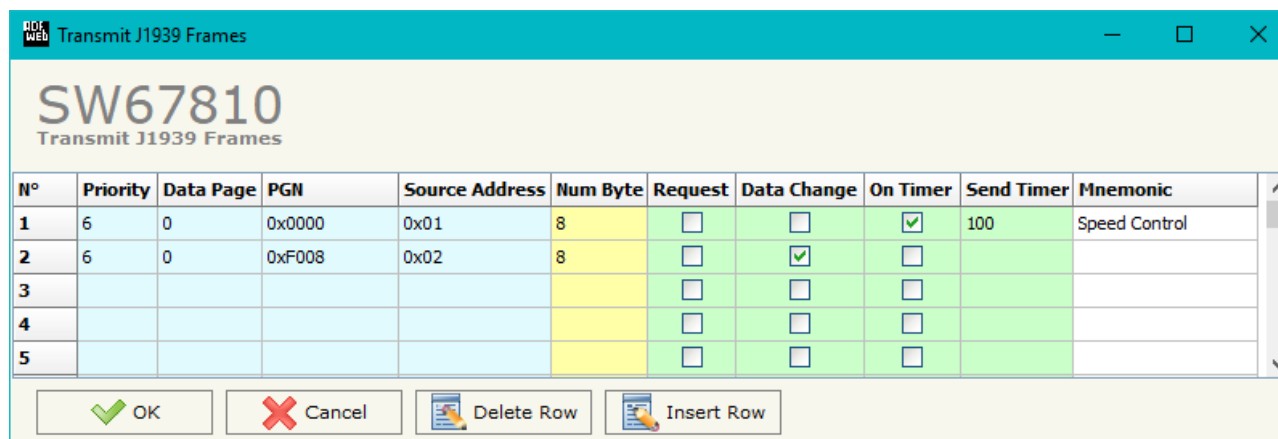


*Figure 5: "Receive J1939 Frames" window*

The data of the columns have the following meanings:

- In the field "**Data Page**" the data page is defined, the value can be 0 or 1 (usually it is 0);
- In the field "**PGN**" the PGN of the data to read from J1939 net is defined (in the J1939 protocol the PGN is an identifier);
- In the field "**Source Address**" the source address of the device that send the frame is defined;
- If the field "**Transport Protocol**" is checked, the frame uses Transport Protocol functions;
- In the field "**Start Byte**" the starting byte to save is defined, this field is enabled only when the field Transport Protocol is checked;
- In the field "**Num Bytes**" the number of bytes starting from the "Start Byte" is defined;
- If the field "**Cancel Data**" is checked, when the PGN is not received for the "TimeOut Data (s)" defined, the values of KNX side are set to 0xFF;
- If the field "**On Request**" is checked, the converter send the J1939 request for the PGN frame with the "**Time (ms)**" defined. This feature is used for PGNs that must be required;
- In the field "**Mnemonic**" a description for the frame is defined.

**SEND FRAMES:**

By pressing the "**Send Frames**" button from the main window for SW67810 (Fig. 2) the "Send Frames" window appears (Fig. 6).
The COB inserted in this table contains the Input data of KNX. These frames are sent by the Converter.



Figure 6: "Transmit J1939 Frames" window

The data of the columns have the following meanings:

+ In the field "**Priority**" the priority of the J1939 message is defined. In J1939 protocol, the priority is a number between 0 and 7. 0 is the highest priority and 7 is the lowest;
+ In the field "**Data Page**" the data page of the J1939 message is defined. The value can be 0 or 1 (usually it is 0);
+ In the field "**PGN**" the PGN of the J1939 message to be written from KNX is defined (in J1939 protocol the PGN is an identifier);
+ In the field "**Source Address**" the address of the device that sends the frame is defined;
+ In the field "**Num Byte**" the length of the PGN is defined;
+ If the field "**Request**" is checked, the J1939 frame is sent when a request frame arrives from J1939 network;
+ If the field "**Data Change**" is checked, the J1939 frame is sent when a byte from KNX side changes value;
+ If the field "**On Timer**" is checked, the J1939 frame is sent cyclically;
+ In the field "**Send Timer**" the delay (in milliseconds) with which sending the J1939 message is defined;
+ In the field "**Mnemonic**" a description for the frame is defined.

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**UPDATE DEVICE:**

By pressing the "**Update Device**" button, it is possible to load the created Configuration into the device; and also the Firmware, if necessary.

If you don't know the actual IP address of the device you have to use this procedure:

➜ Turn OFF the Device;
➜ Put Dip1 of 'Dip-Switch A' in ON position;
➜ Turn ON the device
➜ Connect the Ethernet cable;
➜ Insert the IP "**192.168.2.205**";
➜ Press the "**Ping**" button, "Device Found!" must appear;
➜ Press the "**Next**" button;
➜ Select which operations you want to do;
➜ Press the "**Execute update firmware**" button to start the upload;
➜ When all the operations are "OK" turn OFF the Device;
➜ Put Dip1 of 'Dip-Switch A' at OFF position;
➜ Turn ON the device.

At this point the configuration/firmware on the device is correctly updated.

If you know the actual IP address of the device, you have to use this procedure:

➜ Turn ON the Device with the Ethernet cable inserted;
➜ Insert the actual IP of the Converter;
➜ Press the "**Ping**" button, must appear "Device Found!";
➜ Press the "**Next**" button;
➜ Select which operations you want to do;
➜ Press the "**Execute update firmware**" button to start the upload;
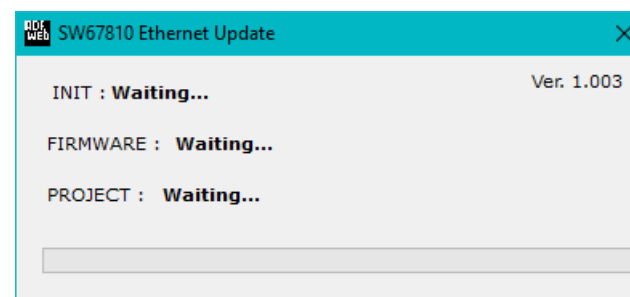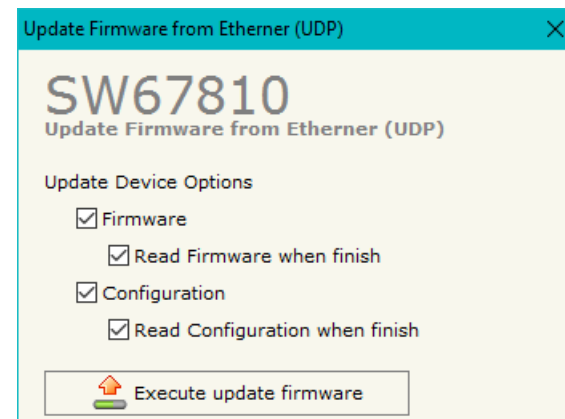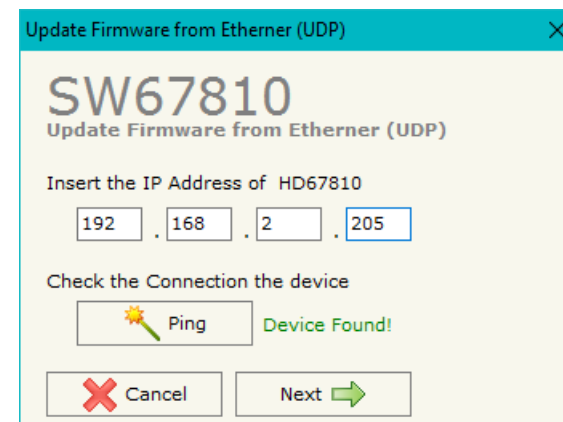➜ When all the operations are "OK" the device automatically goes at Normal Mode.

*Figure 7: "Update device" windows*

Note:
   When you install a new version of the software, if it is the first time it is better you do the update of the Firmware in the HD67810 device.

Note:
   When you receive the device, for the first time, you also have to update the Firmware in the HD67810 device.

Warning:
   If Fig. 8 appears when you try to do the Update try these points before seeking assistance:

- Try to repeat the operations for the updating;
- Try with another PC;
- Try to restart the PC;
- Check the LAN settings;
- Check the Wi-Fi settings;
- If you are using the program inside a Virtual Machine, try to use in the main Operating System;
- If you are using Windows Seven, Vista, 8 or 10 make sure that you have the administrator privileges;
- In case you have to program more than one device, using the "UDP Update", you have to cancel the ARP table every time you connect a new device on Ethernet. For do this you have to launch the "Command Prompt" and write the command "arp -d". Pay attention that with Windows Vista, Seven, 8, 10 you have to launch the "Command Prompt" with Administrator Rights;
- Pay attention at Firewall lock.

In the case of HD67810 you have to use the software "SW67810": www.adfweb.com\download\filefold\SW67810.zip.

SW67810 Ethernet Update

Ver. 1.003

INIT : **PROTECTION**

FIRMWARE : **PROTECTION**

PROJECT : **PROTECTION**
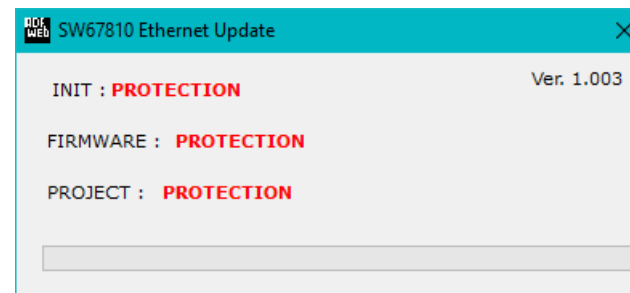
*Figure 8: "Protection" window*

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**MECHANICAL DIMENSIONS:**
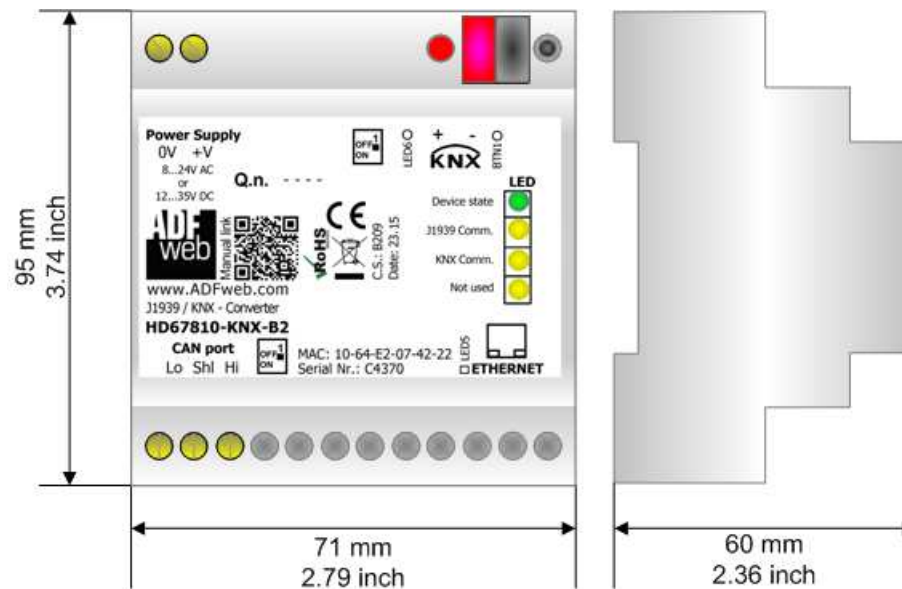
Housing: PVC
Weight: 200g (Approx)

*Figure 9: Mechanical dimensions scheme for HD67810-KNX-B2*

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**ORDERING INFORMATIONS:**

The ordering part number is formed by a valid combination of the following:

**HD67810 – KNX – B 2**

**Connectors Type**
2: Fixed 5mm Screw Terminal

**Enclosure Type**
B: 4M, 35mm DIN Rail mounting

**Device Family**
HD67810-KNX: J1939 / KNX - Converter
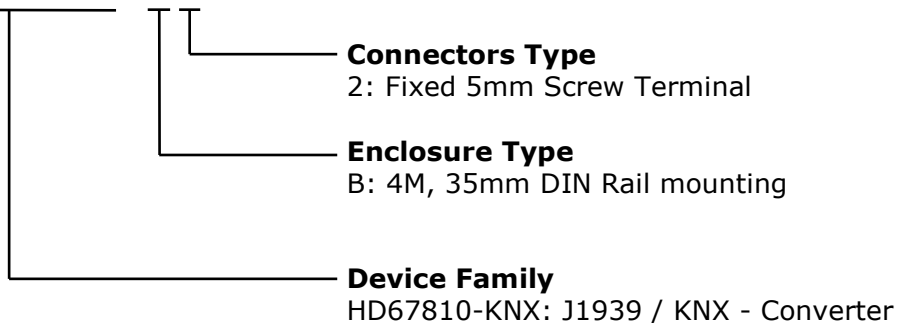
Order Code:  **HD67810-KNX-B2**        -        J1939 / KNX – Converter

**ACCESSORIES:**

Order Code:  **AC34001**        -        35mm Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC
Order Code:  **AC34002**        -        35mm Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC
Order Code:  **AC34-AB1TP**     -        KNX Power Supply - KNX out 640mA - in 240VAC
Order Code:  **AC34-AG1TP**     -        KNX Power Supply - KNX out 640mA + AUX out 30VDC - in 240VAC

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## DISCLAIMER:

All technical content within this document can be modified without notice. The content of the document is a under continual renewal.
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## OTHER REGULATIONS AND STANDARDS:

### WEEE INFORMATION

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).

This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and impact of human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

### RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

### CE MARKING

The product conforms with the essential requirements of the applicable EC directives.

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**WARRANTIES AND TECHNICAL SUPPORT:**

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com.
Otherwise contact us at the address support@adfweb.com

**RETURN POLICY:**

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

- Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
- Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.

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